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SUSTAINABILITY REPORTING AND FINANCIAL PERFORMANCE OF LISTED AGRICULTURE AND NATURAL RESOURCES FIRMS IN NIGERIA

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ABSTRACT

This study examines how sustainability reporting affects the financial performance of Nigerian-listed agriculture and natural resource companies. Using return on assets (ROA) as a proxy for corporate financial performance, the study's particular goals were to ascertain if reporting on economic and social sustainability had an effect on the financial performance of the sampled industries. The annual reports of nine (9) chosen firms were the source of the data from 2014 to 2023. Using the E-Views statistical program, the panel least squares regression approach was used to assess the data. The study found that the financial performance of the examined firms is negatively and insignificantly impacted by reporting on economic and social sustainability. The study concluded that sustainability reporting had no significant effect on the performance of Nigerian listed agriculture and natural resources firms. The research recommends that managers focus on measures that foster a rise in the attributes of economic and social sustainability.

Keywords: Social Reporting, Economic Reporting, Sustainability, Return on Assets, Financial Performance

1.0 INTRODUCTION

The importance of adding information on sustainability problems in corporate reporting methods has increased as a result of advances in businesses throughout the world, particularly in relation to sustainable development. This is bolstered further by the fact that the accountability component of company financial reporting cannot be completely achieved without incorporating sustainability reporting in the annual financial reports, which are why corporate annual reports must include sustainability disclosures. Sustainability reporting is

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described as the disclosure and communication of a company's environmental, social, and governance (ESG) goals, as well as its progress toward these goals, in the accounting disclosure literature (Owolabi & Okulenu, 2020). Organisations are frequently created with the intention of pleasing clients while earning a profit. To accomplish this, they take a variety of acts that have an impact on the environment and society as a whole. These organizations' actions frequently have a harmful impact on the environment (Uwalomwa et al., 2018). Air, water, and noise pollution are among the negative consequences, as are biodiversity loss, freshwater scarcity, global warming, extreme weather events, and a complete disregard for the preservation of both the current and future environments (Asuquo et al., 2018). Firms seek to balance the needs of their stakeholders through corporate responsibility and share this information through sustainability reporting in order to mitigate the negative effects of their actions. Concerns about sustainability can have an enormous impact on a company's overall performance in terms of its brand and reputation. The demands of various stakeholder groups, such as investors, consumers, workers, non-governmental organizations (NGOs), the media, and the community, can be connected to the necessity of complete transparency, ethical considerations, and community concerns.

In today's competitive business world, businesses need to provide sustainability reports in order to monitor their social, economic, and environmental performance and attract more customers in order to succeed. This is done in an effort to draw in investors, as businesses who disclose sustainability information are viewed as transparent (Oncioiu, et al. 2020). The business community has been under pressure for the past 40 years to fulfill its responsibilities to stakeholders, the environment, and the society in which it operates. As a result, interdisciplinary reporting that simultaneously integrates economic, environmental, and social factors into corporate behavior is necessary to preserve resources for future generations (Okafor, Adeusi, & Adeleye, 2019).

The financial performance of Nigeria's listed companies has long been a source of worry. The corporations have been accused of offering insufficient and often misleading returns on investment, depriving investors and other stakeholders of the advantages needed for long-term investment, development, and survival. This problem of insufficient financial performance might be caused by corporations failing to pay attention to environmental harm and its consequences on host communities. According to Ademola, Eluyela, and Oladipo (2020), the majority of businesses fail to include information regarding sustainability reporting in their annual reports, which renders them unaccountable to their local surroundings. These multiple inactions does not uphold the recognized standards and principles on human rights, labour, the environment and anti-corruption in businesses towards an essential contribution to the SDGs. Additionally, there is pressure on businesses to reassure the public of their good behaviour (Oprean-Stan, Oncioiu, Juga & Stan, 2020). However, going beyond regular communication to stakeholders, effective corporate reporting is a key to building trust and aligning investment through transparency and accountability. Sustainability reporting is a strategic tool that engages stakeholders, supports sustainable decision-making processes at all levels within a company, shapes business strategy, guides innovation and drives better performance and value creation, and ultimately attracts investments.

A few of the earlier research in this subject are Okutu and Adegbie (2024), Chiamogu and Okoye (2020), Omesi and Berembo (2020), Etale and Otuya (2020), Nasiru et al. (2020), and

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Owolabi and Okulenu (2020). The primary area of focus for previous studies, aside from the agriculture and natural resources sector, has been many other sectors, leaving a significant institutional vacuum. This study will bridge the gap by adding to the criteria used by previous academics to assess the social and economic measures of sustainability. This study is expected to yield reliable results to determine how listed agriculture and natural resource firms in Nigeria perform financially in relation to sustainability reporting proxies. The study intends to achieve the research objectives with the following hypotheses:

Ho1: Economic reporting has no significant effect on the return on assets of listed agriculture and natural resources firms in Nigeria.

Ho2: Social reporting has no significant effect on the return on assets of listed agriculture and natural resources firms in Nigeria.

2.0 LITERATURE REVIEW

2.1 Conceptual Framework

2.1.1 Sustainability Reporting

According to Jones and Jonas (2011), sustainability reporting (SR) is simply a company's disclosure of information on the following topics: economic, environmental, human rights, labor practices and decent work, society, and product responsibility. It is also known as the triple bottom line reporting, non-financial reporting, corporate responsibility reporting, and sustainable development reporting. Sustainability reporting activities are any actions a business takes to further a social good beyond its own interests, beyond compliance and beyond legal obligations (such as charitable endeavors, fair labor practices, mitigating negative environmental impacts, fair trade, and sustainability practices like reclaiming packaging materials and minimizing water usage and waste product). Chandler and Werther (2014) define sustainability as the ability to meet current needs without compromising the ability of future generations to meet their own needs. Sustainability reporting requires organizations to take the initiative to include social and environmental issues in their work with diverse stakeholders in order to accomplish this. All individuals who are a part of the social environment of the company and who are either positively or negatively impacted by its operations are considered stakeholders. Sustainability reporting, according to Robert et al. (2015), is the process of evaluating, summarizing, and holding organizations accountable for their actions with the goal of sustainable development.

2.1.2 Economic Sustainability Reporting

Economic reporting is a reference to stable economic capital. Examining an organization's external economic effects on society and then attempting to comprehend how these effects might impact the organization's own sustainability constitute the concept of economic sustainability (Makori & Jagongo, 2013). Economic reporting, according to GRI (2011), is the process by which a business provides information about its range of economic operations, including benefits and wages, labor productivity, job creation, research and development, and investment, to its many stakeholders. This study uses salary along with other benefits in accordance with GRI 200 to evaluate the financial aspect of sustainability reporting.

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2.1.3 Social Sustainability Reporting

The Global Reporting Initiative (GRI) (2011) defines social reporting as a reporting category that comprises information on jobs, careers, training and education, diversity and opportunity, community involvement, employee health and safety, and consumer health and safety. This implies that it provides information on social responsibility policies and practices that have the potential to improve a business's standing while reducing potential legal risks and associated costs. When a corporation shares its social engagement, investors are better able to make decisions. This research uses instruction and training as a gauge for social reporting in accordance with GRI 400.

2.1.4 Financial Performance

In accounting literature, profit, return on assets, and economic value are referred to as financial performance (Yazdanfar, 2013). "A subjective measure of how well a firm can use assets from its primary mode of business and generate revenues," is how Kenton (2019) defines financial performance. The phrase is frequently used to describe the general state of a company's finances throughout a specific time frame. Financial performance is a tool used by investors and analysts to evaluate similar companies within the same industry or to analyze industries or sectors overall. To that point, financial success can be measured in a variety of ways, but each metric should be considered as a whole. Line items, such as revenue from operations, operating income, or cash flow from operations can be used, as well as total unit sales."

As the concept of performance has been defined differently, various measures have emerged, classified and are being used differently in as much as the information provided satisfy the interest of all stakeholders. Profitability ratios are used to measure performance status. It indicates how well managers of an enterprise generate earnings by using the resource of the business at their disposal (Dogan, 2013). It is a strong indication of ability to pay dividend and avoid bankruptcy (Tulsian, 2014). Profitability can be measured using return on asset (ROA), return on equity (ROE) and others (Iyoha, 2012). In this study the ROA is adopted as a measure performance. It is calculated as the net income (profit after tax) divided by the total assets of the firm within a financial year. ROA was chosen amongst all the possible proxies as it was detected to be a robust proxy to predict financial performance among the common targeted indicators (Yousaf, M. & Dey, S. K, 2022).

2.2 Empirical Review

The study by Okutu and Adegbie (2024) examined the financial performance and sustainability reporting of Nigerian oil and gas companies. The research used panel data analysis to analyze profitability metrics like return on assets (ROA), return on equity (ROE), and return on capital employed (ROCE). The results showed that CSR reporting significantly impacted ROA, with a positive correlation between environmental sustainability and ROE. However, there was a statistically negligible association between ROI and social sustainability. The study concluded that companies' financial performance is significantly influenced by sustainability reporting, and recommended that they prioritize public disclosure of their sustainability efforts to improve their bottom lines.

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Akinadewo et al. (2023) evaluated the impact of sustainability reporting on the financial performance of Nigerian listed industrial goods enterprises. Panel data analysis and descriptive statistics such as mean, standard deviation, minimum and maximum values were employed to analyze the correlations between the variables. They found that economic sustainability practices have a significant positive association with changes in stock price and total assets, while environmental sustainability practices have a positive and significant impact on financial performance. Community involvement sustainability practices have a positive but less significant impact. The study suggests that environmental sustainability reporting can boost firm profits by encouraging managers to adopt sustainable techniques. The findings highlight the importance of sustainability reporting in enhancing the financial performance of listed enterprises in Nigeria.

Onoh, et al. (2023) examined Nigerian listed oil and gas companies' Tobin's Q value after environmental, social, and economic sustainability reporting. Secondary data from annual reports were examined while relationships and descriptive matrices were used as the analytical techniques. Economic sustainability reporting values showed that less sales growth and leverage negatively impacted sustainability reporting and firm value, while firm size positively impacted it. The research concluded that sustainability laws appealed to investors and increased firm value, and sustainable organizations require financial capital, good governance, and workplace practices that reflect stakeholders' environmental and social needs.

Okon et al. (2023) evaluated the impact of sustainability reporting on the financial performance of listed oil and gas firms in Nigeria between 2012 and 2021. The Nigeria Exchange Group reports, annual reports, and retrospective studies were all consulted. Panel least squares regression was employed in the study to evaluate the three research hypotheses. The study found that Nigerian oil and gas businesses' return on investment is increased by social, health, and environmental transparency. The study found that Nigerian oil and gas businesses' return on investment is impacted by sustainability reporting. According to the study, petroleum corporations should mandate sustainability reporting for the entire industry and use a standard sustainability index to assess compliance.

Ismail et al. (2022) analyzed corporate sustainability reporting and firms' financial performance in 14 emerging nations from 2011-2018. Weighted least square regression and correlational research design were used in the study to analyze the data. The dependent variable was ROA, while sustainability was measured using factors like size, leverage, litigation, market to book value, age, logarithm of GDP, and fixed effects. The findings suggest that sustainability reports significantly enhance the financial success of emerging markets, emphasizing the importance of businesses in developing nations reporting on sustainability.

Wahyuningtyas et al. (2022) examined the impact of sustainability reporting on financial and non-financial performance of companies in Indonesia. The study used secondary data taken from financial reports and sustainability reports of companies that won the green industry award and were listed on the Indonesian stock exchange and have published a sustainability report for the period 2015-2020. Data was analyzed using path analysis and fixed effect regression. Findings from the study show that disclosure of information on economic, social and environmental aspects of sustainability reporting has no significant effect on financial performance. However, the disclosure of economic information has a significant effect on non-

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financial performance in terms of market performance as measured by Tobin's Q. The study recommends that regulators pay more attention to corporate sustainability reports to ensure more transparency in the disclosure of the three aspects in sustainability reports so as to assist countries in achieving sustainable development.

Omesi and Berembo (2020) conducted a study on the relationship between social accounting and financial performance of Nigerian listed oil and gas companies from 2012-2017. They focused on the relationship between social accounting and return on assets. The study used secondary data from annual reports, company accounts, and the Nigeria Stock Exchange. Regression was used for data analysis and hypothesis testing. The results showed no significant relationship between social accounting and performance. The study recommends that oil and gas companies' administration should focus on social spending and dissemination to increase stakeholder confidence and transparency in their operations. The study suggests that companies should focus on social spending and dissemination to improve their performance.

The study by Asuquo et al (2018) investigated the effect of sustainability reporting on the financial performance of Nigerian Brewery firms. The research, which used audited financial statements from 2012-2016, used the ex-post facto design and multiple regression technique. The results showed that Economic Performance Disclosure (ECN), Environmental Performance Disclosure (ENV), and Social Performance Disclosure (SOC) did not significantly impact the return on asset (ROA) of the selected firms. The study recommended that listed firms should improve the quality of sustainability reporting, particularly in ECN, ENV, and SOC areas.

2.3 Theoretical Framework

Sustainability Reporting (SR) is justified by various theories, including signalling theory, stakeholders' theory, institutional theory, and legitimacy theory. Legitimacy theory is the basis for this research, as it posits that organizations are parties to a social compact in harmony with their society. To be accepted by all stakeholders, businesses must fulfill their corporate duties and report on them through sustainability reporting. Legitimacy theory is derived from the concept of organizational legitimacy, which was first introduced by Dowling and Pfeffer in 1975. It provides a broad perspective on social and environmental disclosures, including sustainability reporting. Companies aim to ensure their activities are perceived as legitimate by external parties, which is a resource needed for survival. This legitimacy is achieved through legitimation strategies, which may include specific disclosures or collaboration with other stakeholders who have already gained their legitimacy status in society (Deegan, 2006; Guthrie & Parker, 1989). As argued by Gray et al., (1996) and Hooghiemstra (2000), this theory explains why companies disclose sustainability information as a method to continuously get approval from society to keep performing, and the aim of disclosing certain practices is to strategically manage the company's relations within the wider system in which it operates.

Legitimacy theory suggests that a firm has a social contract with society, which is expressed through changing expectations over time (Shocker & Sethi 1974; Islam & Deegan 2008). Firms have a moral obligation to meet these expectations, and only legitimate firms can utilize society's resources (Deegan & Jeffry 2006). Legitimate firms have the right to fulfill these expectations, and organizations must respond to changing societal expectations to maintain

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their legitimacy. This theory emphasizes the importance of a firm's moral obligation to meet societal expectations to maintain its legitimacy.

3.0 METHODOLOGY

This study utilized the ex-post facto technique, a research design where the study began after facts have been gathered without drawing conclusions. The sample consisted of five (5) agriculture and four (4) natural resources firms listed on the Nigerian Exchange Group (NGX) as of December 31, 2023, with the selected firms having been quoted for at least 10 years and operating between 2014 and 2023.

To meet the study's objectives, descriptive statistics and the ordinary least squares multiple regression technique were employed for analysis. To guarantee the adequacy of the data used in the study, some data robustness tests were performed, including the normality test, variance inflation factor testing, and the hausman specification test. A multiple linear regression model taken from the work of Asuquo et al (2018) is slightly adjusted here to serve as a guide for the research. The model specification is stated thus:

$ROA_{it} = \alpha + \beta_1 logECOR_{it} + \beta_2 logSOR_{it} + \beta_3 FS + e$…….…. 3.1

Where;

ROA_{it}	= Return on assets
$logECOR_{it}$	= Log of economic reporting
$logSOR_{it}$	= Log of social reporting
FS_{it}	= Firm size – the natural logarithm of total assets
α	= Model constant
$\beta_1 – \beta_5$	= Coefficients of the variable used in the models.
e	= error term in the model
Log	= Logarithm

4.0 RESULT AND DISCUSSIONS

Table 1 presents the results of descriptive statistics.

Table 1: Descriptive Statistics Results

	ROA	LNECOR	LNSOR	FS
Mean	0.012621	12.69507	9.699119	16.31262
Median	0.026095	12.90366	10.68056	15.45376
Maximum	0.640525	19.79178	15.18542	22.59233
Minimum	-0.227879	8.797851	5.225747	12.85662
Std. Dev.	0.128601	2.351698	2.581469	2.384010
Skewness	1.276716	0.628935	-0.132905	1.064778
Kurtosis	7.911187	3.761907	1.786867	3.698864
Jarque-Bera	114.8991	8.110268	5.783797	18.83782
Probability	0.000000	0.017333	0.055471	0.000081
Sum	1.135884	1142.556	872.9207	1468.136
Sum Sq. Dev.	1.471906	492.2131	593.0946	505.8319

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Observations	90	90	90	90

Source: E-Views 12 Output (2024)

Table 1 presents the descriptive statistics for all variables. The table shows that ROA has a mean of 0.012621, with a standard deviation of 0.128601, a minimum value of -0.227879 and maximum value of 0.640525. As observed, an overall average of 1.2% of ROA with a maximum average of about 64.05% is an indication of an increasing profit earnings margin in relation to the overall resources of the sampled firms. The standard deviation shows that there is no wide dispersion of the data from the mean value judging by the range between the minimum and maximum values which also implies stability in performance. However, the negative minimal value of ROA suggests that not all the sampled companies generated enough income compared to the capital they invested during the period under review. For social reporting (LNSOR) variables, the table shows a mean, standard deviation, minimum and maximum values of 9.699119, 2.581469, 5.225747, and 15.18542 respectively. The standard deviation shows a fairly wide dispersion of the data from the mean value judging by the range between the minimum and maximum values. Likewise, the table shows that LNECOR during the period has an increase in salary and wages, and other benefits cost for employees during the study period. Accordingly, for the firm size (FS), which is the control variable, it has a mean value of 16.31262 with a standard deviation of 2.384010, and minimum and maximum values as 12.85662 and 22.59233 respectively. The LNSOR variable has the highest value of dispersion (2.581469) from the mean.

The skewness measurement indicated that LNECOR, FS and ROA shows positively-skewed distributions with values above zero which suggests that the distribution will have values above the sample average in the distribution. The Kurtosis value of ROA, LNECOR and FS is leptokurtic because the values are higher than 3 which indicate the figures in the series will be higher than the sample average.

The study employed panel Ordinary Least square regression analysis using the fixed effect model to explore the objective of the study. Table 2 shows the baseline estimation result in which the two proxies for sustainability reporting are regressed on the ROA of the sampled firms in Nigeria.

Table 2: Fixed Effect Regression Analysis

Dependent Variable: ROA
Method: Panel Least Squares
Date: 02/03/24 Time: 10:22
Sample: 2014 2023
Periods included: 10
Cross-sections included: 9
Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.812086	0.441379	1.839885	0.0696
LNECOR	0.019143	0.019112	1.001654	0.3196
LNSOR	0.005175	0.021805	0.237340	0.8130

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FS	-0.066984	0.032196	-2.080523	0.0408

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.579285	Mean dependent var	0.012621
Adjusted R-squared	0.519953	S.D. dependent var	0.128601
S.E. of regression	0.089102	Akaike info criterion	-1.874507
Sum squared resid	0.619253	Schwarz criterion	-1.541199
Log likelihood	96.35281	Hannan-Quinn criter.	-1.740098
F-statistic	9.763503	Durbin-Watson stat	1.713374
Prob(F-statistic)	0.000000		

Source: E-Views 12 Output (2024)

Table 2 presents and analyses the fixed effect regression result of the explained variables proxied by ROA and the explanatory variables (LNSOR and LNECOR). The range of values between the R2 and Adjusted R2 is between 58% and 52% respectively. The R2 of 58% explains the variation of the dependent variable (ROA) as a result of the changes in the independent variables. It can therefore be inferred that the independent variables have combined predictive power of 58% impacting on the financial performance of listed sampled firms operating in Nigeria, while the remaining 42% can be explained by the error term not in the model. Furthermore, the regression result reveals a positive intercept of 0.812086 which implies that when other variables are held constant; the ROA of the sampled firms is improved by 81%.

Going by the results, economic reporting (LNECOR) shows a positive relationship with the ROA of the sampled firms. It reveals a beta coefficient of 0.019143 and a correspondent P-value of 0.3196, which lies above the 5% level of significance. This implies that a unit change in economic reporting will not have a significant effect on financial performance of listed sampled firms therefore the result fails to reject the null hypothesis. The result further shows that social reporting (LNSOR) positively influences the ROA of the sampled firms with a beta coefficient of 0.005175 and a P-value of 0.8130, which is above the 5% level of significance. This implies that the null hypothesis is accepted because the effect of social responsibility reporting on the ROA is not significant.

4.1 Discussion of Findings

The result from the study shows that economic sustainability reporting has a positive insignificant effect on the ROA of agriculture and natural resources firms in Nigeria. The study further shows social sustainability reporting has a positive insignificant effect on the ROA of agriculture and natural resources firms in Nigeria. This finding is in line with those of Omesi and Berembo (2020), and Asuquo et al. (2018) who looked at the effect of sustainability reporting on the financial performance of a sample of listed Nigerian brewery firms and discovered that economic and social sustainability reporting had no significant effect on return on assets of the sampled listed Nigerian firms.

5.0 CONCLUSION AND RECOMMENDATIONS

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The study investigated the effect of sustainability reporting on the financial performance of Nigerian listed agriculture and natural resources firms. It focused on the effect of economic and social sustainability on these firms. The study used GRI 200 & 400 implementation guidelines for sustainability disclosure metrics and return on assets (ROA) as performance measure. The results showed that ROA was not significantly affected by sustainability reporting indicators, indicating that sustainability reporting does not significantly affect the financial performance of listed agriculture and natural resources firms in Nigeria.

In accordance with the study's findings, the following recommendations are made:

i. Managers should make efforts to satisfy the specific needs of education and training. This will increase the likelihood of approval on social sustainability policy engagement leading to minimizing corporate losses.
ii. Managers should concentrate on policies like good salaries and wages that increased economic reporting.

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APPENDICES

Appendix 1: Sampled Agriculture and Natural Resources Companies in Nigeria

S/N	Company	Sector
1.	Ellah Lakes Plc.	Agriculture
2.	FTN Cocoa Processors Plc.	Agriculture
3.	Livestock Feeds Plc.	Agriculture
4.	Okomu Oil Palm Plc.	Agriculture
5.	Presco Plc.	Agriculture
6.	Aluminium Extrusion Plc.	Natural Resources
7.	Industrial & Medical Gas	Natural Resources
8.	Multiverse Mining & Exploration Plc.	Natural Resources
9.	Thomas Wyatt Nig. Plc.	Natural Resources

Source: ngxgroup.com, 2024

E-VIEWS 12 OUTPUTS

Appendix 2: Descriptive Analysis

	ROA	LNECOR	LNSOR	FS
Mean	0.012621	12.69507	9.699119	16.31262
Median	0.026095	12.90366	10.68056	15.45376
Maximum	0.640525	19.79178	15.18542	22.59233
Minimum	-0.227879	8.797851	5.225747	12.85662
Std. Dev.	0.128601	2.351698	2.581469	2.384010

Skewness	1.276716	0.628935	-0.132905	1.064778
Kurtosis	7.911187	3.761907	1.786867	3.698864
Jarque-Bera	114.8991	8.110268	5.783797	18.83782
Probability	0.000000	0.017333	0.055471	0.000081
Sum	1.135884	1142.556	872.9207	1468.136
Sum Sq. Dev.	1.471906	492.2131	593.0946	505.8319
Observations	90	90	90	90

Appendix 3: Correlation Matrix

	ROA	LNECOR	LNSOR	FS
ROA	1.000000			
LNECOR	0.251151	1.000000		
LNSOR	0.458372	0.703534	1.000000	
FS	0.118239	0.862407	0.633509	1.000000

Appendix 4: Fixed Effect Likelihood Ratio (Test between Pooled and Fixed)

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	7.155042	(8,78)	0.0000
Cross-section Chi-square	49.531016	8	0.0000

Cross-section fixed effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 02/03/24 Time: 10:24
Sample: 2014 2023
Periods included: 10
Cross-sections included: 9
Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.033661	0.082856	-0.406256	0.6856
LNECOR	0.012336	0.010862	1.135647	0.2593
LNSOR	0.028959	0.006474	4.473105	0.0000
FS	-0.023981	0.009841	-2.436745	0.0169

R-squared	0.270543	Mean dependent var	0.012621
Adjusted R-squared	0.245096	S.D. dependent var	0.128601
S.E. of regression	0.111735	Akaike info criterion	-1.501940
Sum squared resid	1.073692	Schwarz criterion	-1.390837
Log likelihood	71.58731	Hannan-Quinn criter.	-1.457137
F-statistic	10.63195	Durbin-Watson stat	1.031076
Prob(F-statistic)	0.000005		

Appendix 5: Hausman Test (Test between Random and Fixed)

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.688736	3	0.0271

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LNECOR	0.019143	0.007959	0.000124	0.3160
LNSOR	0.005175	0.024973	0.000301	0.2541
FS	-0.066984	-0.026141	0.000725	0.1292

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 02/03/24 Time: 10:28
Sample: 2014 2023
Periods included: 10
Cross-sections included: 9
Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.812086	0.441379	1.839885	0.0696
LNECOR	0.019143	0.019112	1.001654	0.3196
LNSOR	0.005175	0.021805	0.237340	0.8130
FS	-0.066984	0.032196	-2.080523	0.0408

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.579285	Mean dependent var	0.012621
Adjusted R-squared	0.519953	S.D. dependent var	0.128601
S.E. of regression	0.089102	Akaike info criterion	-1.874507
Sum squared resid	0.619253	Schwarz criterion	-1.541199
Log likelihood	96.35281	Hannan-Quinn criter.	-1.740098
F-statistic	9.763503	Durbin-Watson stat	1.713374
Prob(F-statistic)	0.000000		

Appendix 6: Pooled Regression Analysis

Dependent Variable: ROA
Method: Panel Least Squares
Date: 02/03/24 Time: 10:21
Sample: 2014 2023
Periods included: 10
Cross-sections included: 9
Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.033661	0.082856	-0.406256	0.6856
LNECOR	0.012336	0.010862	1.135647	0.2593
LNSOR	0.028959	0.006474	4.473105	0.0000
FS	-0.023981	0.009841	-2.436745	0.0169

R-squared	0.270543	Mean dependent var	0.012621
Adjusted R-squared	0.245096	S.D. dependent var	0.128601
S.E. of regression	0.111735	Akaike info criterion	-1.501940
Sum squared resid	1.073692	Schwarz criterion	-1.390837
Log likelihood	71.58731	Hannan-Quinn criter.	-1.457137
F-statistic	10.63195	Durbin-Watson stat	1.031076
Prob(F-statistic)	0.000005		

Appendix 7: Fixed Effect Regression Analysis

Dependent Variable: ROA
Method: Panel Least Squares
Date: 02/03/24 Time: 10:22
Sample: 2014 2023
Periods included: 10
Cross-sections included: 9
Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.812086	0.441379	1.839885	0.0696
LNECOR	0.019143	0.019112	1.001654	0.3196
LNSOR	0.005175	0.021805	0.237340	0.8130
FS	-0.066984	0.032196	-2.080523	0.0408

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.579285	Mean dependent var	0.012621
Adjusted R-squared	0.519953	S.D. dependent var	0.128601
S.E. of regression	0.089102	Akaike info criterion	-1.874507
Sum squared resid	0.619253	Schwarz criterion	-1.541199
Log likelihood	96.35281	Hannan-Quinn criter.	-1.740098
F-statistic	9.763503	Durbin-Watson stat	1.713374
Prob(F-statistic)	0.000000		

Appendix 8: Random Effect Regression Analysis

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 02/03/24 Time: 10:27
Sample: 2014 2023
Periods included: 10
Cross-sections included: 9
Total panel (balanced) observations: 90
Swamy and Arora estimator of component variances

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.095800	0.193504	0.495080	0.6218
LNECOR	0.007959	0.015519	0.512846	0.6094
LNSOR	0.024973	0.013196	1.892535	0.0618
FS	-0.026141	0.017661	-1.480185	0.1425

Effects Specification	S.D.	Rho
Cross-section random	0.086839	0.4871
Idiosyncratic random	0.089102	0.5129

Weighted Statistics			
R-squared	0.060390	Mean dependent var	0.003895
Adjusted R-squared	0.027613	S.D. dependent var	0.090719
S.E. of regression	0.089458	Sum squared resid	0.688234
F-statistic	1.842454	Durbin-Watson stat	1.600328
Prob(F-statistic)	0.145504		

Unweighted Statistics			
R-squared	0.237535	Mean dependent var	0.012621
Sum squared resid	1.122277	Durbin-Watson stat	0.981398

Appendix 9: Variance Inflation Factors

Variance Inflation Factors
Date: 02/03/24 Time: 10:36
Sample: 2014 2023
Included observations: 90

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LNECOR	0.000118	141.7271	4.651578
LNSOR	4.19E-05	30.41407	1.991071
FS	9.69E-05	189.7151	3.924108
C	0.006865	49.48946	NA

